CLAIMS

WHAT IS CLAIMED:

1.   A method for distinguishing between sources of process variation, comprising:

processing a plurality of manufactured items in a process flow;

5   storing a set of production environment data associated with each of the manufactured

items;

identifying manufactured items associated with a process drift;

generating a plurality of characteristic threads based on the production environment

data;

10   comparing the characteristic threads for at least those manufactured items associated

with the process drift; and

determining at least one potential cause for the process drift based on the comparison

of the characteristic threads.

15   2.   The method of claim 1, further comprising grouping the characteristic threads

into characteristic categories.

3.   The method of claim 2, wherein comparing the characteristic threads

comprises comparing the characteristic threads in a particular characteristic category for all of

20   the manufactured items to the characteristic threads in the particular characteristic category

for the manufactured items associated with the process drift.

4.   The method of claim 3, further comprising calculating a plurality of

characteristic thread ratios, wherein each characteristic thread ratio comprises the ratio of

manufactured items in the characteristic thread associated with the process drift to a total number of manufactured items in the characteristic thread.

5.   The method of claim 4, wherein determining the at least one potential cause

5   for the process drift comprises identifying a particular characteristic thread ratio in one characteristic category that differs from other characteristics thread ratios in the same characteristic category.

6.   The method of claim 1, wherein processing the plurality of manufactured

10   items in the process flow comprises processing a plurality of semiconductor wafers in a semiconductor device manufacturing process flow.

7.   The method of claim 6, wherein processing the plurality of semiconductor wafers comprises processing the plurality of semiconductor wafers grouped into lots of

15   wafers, and identifying the manufactured items associated with the process drift comprises identifying particular lots of wafers associated with the process drift.

8.   The method of claim 6, wherein generating the plurality of characteristic threads comprises based on the production environment data comprises generating

20   characteristic threads for processing tools in the process flow.

9.   The method of claim 6, wherein generating the plurality of characteristic threads comprises based on the production environment data comprises generating characteristic threads for metrology tools used to measure characteristics of semiconductor

25   wafers in the process flow.

10. The method of claim 6, wherein generating the plurality of characteristic threads comprises based on the production environment data comprises generating characteristic threads based on incoming characteristics of semiconductor wafers in the process flow.

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11. The method of claim 6, wherein generating the plurality of characteristic threads comprises based on the production environment data comprises generating characteristic threads based on operating recipe parameters used for processing semiconductor wafers in the process flow.

12. A manufacturing system, comprising:

a plurality of tools for processing manufactured items in a process flow;

a database server adapted to store a set of production environment data associated with each of the manufactured items; and

a drift monitor adapted to identify manufactured items associated with a process drift, generate a plurality of characteristic threads based on the production environment data, compare the characteristic threads for at least those manufactured items associated with the process drift, and determine at least one potential cause for the process drift based on the comparison of the characteristic threads.

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13. The manufacturing system of claim 12, wherein the drift monitor is adapted to group the characteristic threads into characteristic categories.

14.   The manufacturing system of claim 13, wherein the drift monitor is adapted to compare the characteristic threads in a particular characteristic category for all of the manufactured items to the characteristic threads in the particular characteristic category for the manufactured items associated with the process drift.

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15.   The manufacturing system of claim 14, wherein the drift monitor is adapted to calculate a plurality of characteristic thread ratios, wherein each characteristic thread ratio comprises the ratio of manufactured items in the characteristic thread associated with the process drift to a total number of manufactured items in the characteristic thread.

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16.   The manufacturing system of claim 15, wherein the drift monitor is adapted to identify a particular characteristic thread ratio in one characteristic category that differs from other characteristics thread ratios in the same characteristic category as the at least one potential cause for the process drift.

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17.   The manufacturing system of claim 12, wherein the manufactured items comprise semiconductor wafers processed in a semiconductor device manufacturing process flow.

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18.   The manufacturing system of claim 17, wherein the semiconductor wafers are grouped into lots of wafers, and the drift monitor is adapted to and identify particular lots of wafers associated with the process drift.

19.   The manufacturing system of claim 17, wherein the drift monitor is adapted to

25   generate characteristic threads for processing tools in the process flow.

20.   The manufacturing system of claim 17, wherein the drift monitor is adapted to generate characteristic threads for metrology tools used to measure characteristics of semiconductor wafers in the process flow.

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21.   The manufacturing system of claim 17, wherein the drift monitor is adapted to generate characteristic threads based on incoming characteristics of semiconductor wafers in the process flow.

10   22.   The manufacturing system of claim 17, wherein the drift monitor is adapted to generate characteristic threads based on operating recipe parameters used for processing semiconductor wafers in the process flow.

23.   A manufacturing system, comprising:

means for processing a plurality of manufactured items in a process flow;

15   means for storing a set of production environment data associated with each of the

manufactured items;

means for identifying manufactured items associated with a process drift;

means for generating a plurality of characteristic threads based on the production

20   environment data;

means for comparing the characteristic threads for at least those manufactured items

associated with the process drift; and

means for determining at least one potential cause for the process drift based on the

comparison of the characteristic threads.

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